

### Notes on the population crash of *Aglais urticae* L. the Small Tortoiseshell butterfly

Having recently moved to Cambridgeshire from the Isle of Skye, it has been quite a surprise to witness at first hand the enormous reduction in population of *Aglais urticae* that has taken place in south-east England. The large numbers of *Buddleja* or "Butterfly Bushes" which grow in most gardens are almost totally lacking in butterflies. Only one or two *Vanessa atalanta*, *V. io* and *Polygonia c-album* are occasional visitors. I had noticed the mention of this in last years entomological notes (Allen, 2001. *Ent. Rec.* **113**: 261-262), but I had not appreciated the full extent of this disaster.

The millions of *A. urticae* which once gave pleasure to nature lovers of all ages, have almost entirely disappeared. I have seen only one individual this summer. Apparently the situation has been deteriorating for at least three years. The cause of this dramatic population crash of one of our commonest butterflies is of primordial interest to all lepidopterists and remains a mystery. Any information that might help us to understand the reasons behind this disaster should be presented and discussed.

On the Isle of Skye, *A. urticae* was still fairly common on the Watnish peninsular in 2001. Colonies of larvae were to be found wherever the foodplant grew in well-established clumps. Adult butterflies were common in sheltered gardens on sunny summer days and were also numerous during autumn and winter when they could be found hibernating on walls and ceilings in sheds and byres etc.

It has been suggested that the population crash of *A. urticae* is somehow related to global warming and that perhaps milder and wetter winters have caused the decline of the species. It has been proposed that warmer winters provoke an increase in metabolism, thus resulting in hibernating butterflies becoming active on sunny days. If this were the case, they would need a food source in order to maintain their activity. Unfortunately, in winter there are no flowers at which butterflies can feed and the result is death by starvation.

The evidence from Skye tends to oppose this suggestion. The normal winter conditions on Skye are relatively mild when compared with mainland Britain. The proximity of the sea and the warmer waters of the Gulf Stream make freezing temperatures and frosts much less frequent. Throughout the year rainfall and humidity are probably second-to-none in the British Isles and the island is always wet and humid. Atlantic winds are frequent, making suitable conditions for flight to take place extremely limited. Adult butterflies tend to remain in the shelter of ravines and gullies. Despite these unusual climatic conditions, *A. urticae* has occurred in large numbers year after year. Nevertheless, the possibility that global warming is involved in the demise of *A. urticae* cannot be rejected until further evidence is submitted.

In 2001, I recorded an enormous population of *V. cardui* larvae in north-west Skye. Almost every plant of the common thistle had one or more larvae webbed into the upper leaves. I estimated that there were approximately two million larvae in the fields alongside the road for a distance of 25 miles. I raised a number of adults from larvae taken in the wild, mainly with the objective of determining if there were any

parasites or entomophagous fungi. Strangely, I did not see even one adult butterfly of this species in the wild, either before or after witnessing this unusual population boom. Having given some thought to the reasons behind the lack of emerging adults, I concluded that it was either predation by voles or adverse climatic conditions. There has been an enormous increase in vole populations throughout Skye and small mammals such as the vole often seek out caterpillars and/or chrysalids when in large numbers, resulting in a high density-dependant mortality. *V. cardui* is here also at its most northern limit of distribution, probably limited by climatic conditions. Unlike *A. urticae*, however, which can be said to be common, *V. cardui* is hardly ever seen on Skye in its adult stage.

This unusual disappearance from south-east England of one of our commonest butterflies may be a biological indicator of some importance, particularly so when correlated with a similar drastic reduction in population of one of our commonest moths, *Arctia caja* – the Garden Tiger. Have any of our government entomologists carried out investigations of this unusual occurrence? Has the population ecology of *Aglais urticae* been studied and, if so, what were the main causes of mortality? Could changes in pollution levels (such as that which affected the Common Sparrow) or UV radiation be involved? Allen (*op. cit.*) mentioned a similar observation in the Slovak Republic almost ten years ago, so the cause of this dramatic decline is perhaps widespread. I am sure that many of our readers and members of the general public would like some answers to these questions.—LEONARD MCLEOD, 22 Maris Green, Great Shelford, Cambridge CB2 5EQ.

#### INVITED COMMENT

We have recently been studying the decline of the Garden Tiger moth, *Arctia caja* using data collected from the standard Rothamsted Insect Survey light-traps over Great Britain from 1968-1998. We have found that, among traps that captured Garden Tiger moths, the average number captured per year fell 28% (from 4.2 to 3.0), mostly during the mid-1980s (Conrad, Woiwod and Perry, 2002 *Biological Conservation* **106**, 329-337). Furthermore, the proportion of traps capturing Garden Tiger moths fell 30% (from 0.60 to 0.42). Thus, in 1990s, there were fewer light-traps catching fewer moths than in the 1960s and 1970s. Moreover, the greatest decline in Garden Tiger numbers has been in the south-east of England and populations in the north-east of Scotland increased slightly in the 1990s. The Garden Tiger moth is not near the limits of its range in the UK, but our regression modelling showed that low numbers of Garden Tigers are associated with warm, wet winters and rapidly warming springs. This is the type of weather which is expected to occur more frequently as a result of global warming, suggesting that the future may not be good for the Garden Tiger moth in much of the UK. It seems that the decline in the small tortoiseshell butterfly, *Aglais urticae*, noted by Leonard McLeod is a more recent phenomenon and it is not yet clear whether it is just part of the natural fluctuations of this species or part of a longer climate related trend. —KELVIN CONRAD AND IAN WOIWOD, Rothamsted Insect Survey, Harpenden, Hertfordshire AL5 2JQ.